

The U.S. Advanced Battery Consortium—automakers and DOE team up to establish American leadership in new automotive technology

The environmental benefits of zero-emitting electric vehicles (EVs) are substantial, but the lack of a battery capable of providing the range and performance that would be acceptable to the consumer has proven to be a major drawback in their development. American, Japanese and European companies and consortia are actively working on producing advanced batteries that can help make EVs practical for everyday use. If American industry can take the lead now, it could herald an era of American dominance in a new automotive arena, as well as significantly further our nation's energy security goals.

The Big Three team up with DOE and others to lead the way

The level of R&D effort required to adequately explore all the promising battery technologies would be expensive and time consuming. It would not be practical for any one company to perform this level of activity while still meeting its responsibilities to its employees, customers and other stakeholders. On January 31, 1991, Chrysler, Ford and General Motors, the Big Three American automakers, entered an agreement to pool their technical knowledge and funding, looking to accelerate progress by collectively combining expertise and reducing individual risk. Their partnership is called the United States Advanced Battery Consortium, or USABC.

The U.S. Department of Energy (DOE), which has long had extensive battery-related R&D activities underway, joined the partnership later in the year, providing expertise and funding. DOE also acts in an advisory and oversight role for various USABC committees and projects.

To make EVs practical in the shortest possible timeframe, many battery-related issues—such as

standardization of charging systems—must be settled early on. As part of the partnership, the Electric Power Research Institute (EPRI), the technical research arm of the electric utility industry, and several individual utilities are providing vital input, as well as funding and staff.

The partnership among the Big Three is slated to run 12 years. The cooperative agreement between the Big Three and DOE covers a period of four years and establishes funding of \$260 million, cost-shared equally between government and industry.

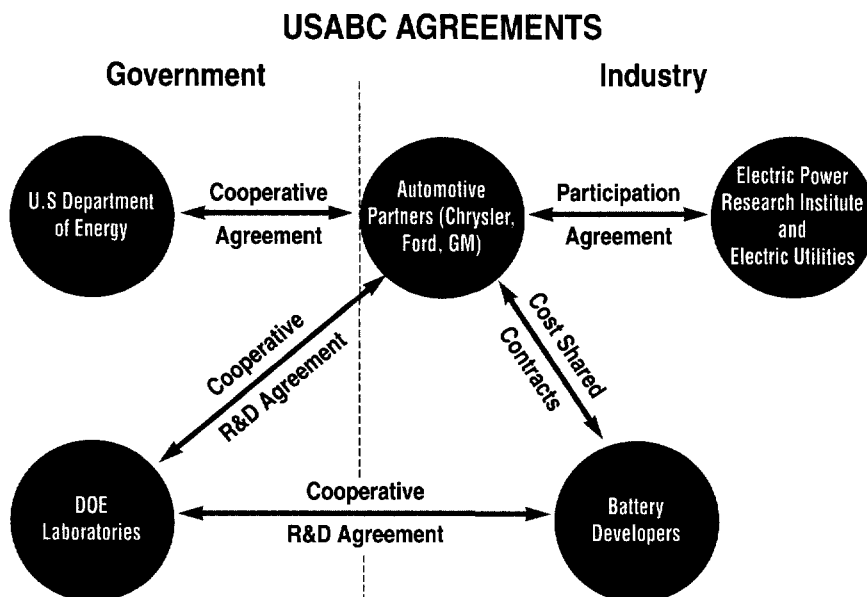
The focus is on batteries

The key to making EVs practical is the development of batteries that can provide performance comparable with conventional vehicles, and at comparable cost. Today's lead acid batteries have limited range, allowing drivers to travel only relatively short distances before they must recharge. Sustainable speeds, also, are not in line with those demanded by today's consumers. Current technology provides batteries with an energy-to-weight ratio of 30-40 watt hours per kilogram, at a cost up to \$150 per kilowatt hour.

USABC has set a mid-term goal to have in prototype production by 1995 batteries with energy-to-weight ratios of 80-100 watt hours per kilogram, at a cost of less than \$150 per kilowatt hour. Other goals include power-to-weight ratios of 150-200 watts per kilogram and a five-year useful life. Nickel-metal hydride, as well as sodium-sulfur and other sodium-beta batteries, are the likely technologies to meet these goals.

The Consortium has also set longer-term goals, looking by late in the decade to have batteries in prototype production that can provide an energy-to-weight ratio of 200 watt hours per kilo-

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gram at a cost of less than \$100 per kilowatt hour, as well as power-to-weight ratio of 400 watts per kilogram and a 10-year useful life. Lithium-iron disulfide and lithium-polymer batteries are the most promising technologies to meet these goals, and other technologies are also being investigated.

USABC's mid-term goals are consistent with the need to introduce EVs that meet California automotive emissions regulations by 1998. The longer-term goals are designed to produce zero-emitting EVs that are competitive in every way with conventional gasoline automobiles.

Diverse projects underway

Working toward both mid- and longer-term goals, USABC has awarded a number of research contracts to outside groups for work on specific battery technologies. These include Ovonic Battery Corporation (nickel-metal hydride), Silent Power (sodium-sulfur), Saft America (nickel-metal hydride, lithium-iron disulfide), and two multi-company efforts led by W.R. Grace and 3M (lithium-polymer). Where foreign-owned companies are involved, at least 50% of the batteries produced for the U.S. auto industry must be

manufactured in the United States.

USABC is also sponsoring technical projects at several DOE National Laboratories, by way of Cooperative Research and Development Agreements (CRADAs) which make it easier to partner government and private sector resources. DOE laboratories involved include Lawrence Berkeley National Laboratory, National Renewable Energy Laboratory, Argonne National Laboratory, Sandia National Laboratory and Idaho National Engineering Laboratory.

A model for intercompany and government/industry partnerships

USABC is actually only one of many partnerships among otherwise competitive American automakers. Chrysler, Ford and General Motors have joined forces under the U.S. Council for Automotive Research (USCAR) to tackle many crucial automotive technology challenges and help boost the competitiveness of American industry. USABC is one of the largest ventures under the USCAR agreement.

In addition, the automakers and DOE have, through USABC, developed and pioneered several new procedures that could maximize the success of government/industry partnerships, and could lead the way toward more such partnerships in the future.

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